### A TRAINING MANUAL

IN

### APPROPRIATE COMMUNITY TECHNOLOGY:

An Integrated Approach for Training Development Facilitators

bу

The Farallones Institute Rural Center and CHP International, Inc.
in collaboration with
The Peace Corps Energy Project/OPTC

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# The Farallones Institute Rural Center



The Farallones Institute is a non-profit organization active in the development of appropriate community technologies, with an emphasis on renewable sources of energy and food systems. Areas of expertise include:

- \* Design and implementation of training programs, with a focus on experiential learning and the acquisition of integrated skills
- \* Development of educational materials
- Resource gathering and information sharing
- Design, use and evaluation of smallscale technologies
- \* Study trips to rural China
- \* Consulting services

### CHP INTERNATIONAL, INC.

CHP International, Inc. is a consulting firm specializing in the design, management and evaluation of international training programs. It develops and conducts technical, cross-cultural and language programs in Latin America, Asia and Africa. In addition, CHP International, Inc. leads staff development workshops in the techniques necessary to effectively implement competency based and experiential training programs.

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# PREFACE

This training manual represents more than two years of involvement with the Peace Corps Energy Project. The manual was begun in October 1979 as one component of a pilot training program undertaken by the Farallones Institute and CHP International, Inc., and has been completed in accordance with the terms of a second contract.

During that time, we have written a preliminary draft, a revision of those materials, and the current training manual. In addition, we have conducted four training cycles at the Farallones Institute Rural Center, based in large part upon the content of this manual.

We believe that our involvement has produced a valuable and adaptable learning tool. However, the manual must continue to be tested, evaluated and modified in order to reflect changing needs and circumstances. It is our hope that you will contribute to that process, and that you will help make the manual more appropriate and useful during future training programs.

If you have observations or suggestions about the contents, methods or approach included in the manual, please contents the authors at the Farallones Institute or CHP Internation.

### ACKNOWLEDGMENTS

Appropriate technology reminds us that before we choose our tools and techniques, we must choose our dreams and values, for some technologies serve them, while others make them unobtainable.

Tom Bender, in Rainbook

There have been many valuable sources of support during the development of the program and training materials. It is only with the help of many people that we have been able to document the various tools and techniques that we have chosen to use in training people to go gently and lightly into the lives of others.

We owe a great deal of gratitude to the people of Peace Corps/Washington for locating resources and lending sustained support to our efforts throughout the project. Our thanks go to past and present staff of the Peace Corps Energy Project, the Office of Training and Programming Coordination (OPTC), Information Collection and Exchange (ICE), and the ACTION Library.

We are also grateful to the people of the Aprovecho Institute; their substantial contribution to the design, development and testing of the cookstove component has been invaluable.

In addition, our thanks go to the people of the Appropriate Technology Project/Volunteers in Asia, and to the staff of the Hesperian Foundation for their continued help and inspiration. Although we cannot mention tham all by name, we also thank the many kind people who have contributed by giving us permission to use materials they have developed.

Special thanks are extended to the members of the Farallones community for their continued support, endurance and patience during the evolution of this project.

Finally, perhaps our most important acknowledgment should go to the Peace Corps trainees who have come to learn and, in turn, to teach. It is with them that we have shared our dreams and values. We hope that the tools and techniques they have chosen will serve the world kindly and well.



# INTRODUCTION

Basic to the purpose of this program is the belief that appropriate community technology represents as much a process as a philosophy. The process begins when people take an active role in their own education; it continues as they identify not only their needs, but also the resources, abilities and methods that will help them make decisions and address their problems in ways that are both sustainable and locally appropriate.

The philosophy of appropriate community technology reaffirms what most of the world's villagers know inherently -- that culture, social systems, politics, religion, economics and ecology are all threads in the same fabric of community life; and that technology exists only as a tool, a loom upon which all the other threads are woven.

The first role of the community facilitator is to respect and understand the intricacy and interdependence of the factors that define a community. Only then is it appropriate to assist and encourage people to utilize their talents, apply their creativity, and recognize options for change. As the process continues, the facilitator -- in this case, a Peace Corps Volunteer -- works with the community, learning from and building upon traditions and indigenous technologies that have evolved in response to local values, needs and conditions. Appropriate change must happen slowly, carefully, and from within; it should not be the result of outside imposition, regardless of good intentions.

An important part of this program is the recognition that technical expertise is significant and useful only when it is applied in balance with other qualities. It is of little importance for a person to be technically competent without the ability to work in cooperation with others, and help motivate them towards a more self-reliant and healthy life. For this reason, it is essential that future Peace Corps Volunteers develop a variety of complementary skills, knowledge and attitudes that will serve to weave together the many threads of appropriate community technology. This training program is committed to, and based upon, that process and philosophy.

# DESIGN AND CONTENT OF THE PROGRAM

The training program is a model for future community work, and therefore emphasizes the parallels that exist between training and Peace Corps service. Throughout the eight weeks of the program, participants are encouraged to take a full and active role in their own education, and to make decisions that will affect them and the people with whom they work and live. They are urged to cooperate with others to identify and use the talents and resources that are available in the group, and to practice skills that help motivate people, instill within them a sense of self-confidence, and involve them in the process of

their own education. In addition, the training program provides an opportunity for participants to examine their values, and to look carefully at the issues that will shape their role as community facilitators.

The approach to training is based on the principles of non-formal education, and is designed to strike a balance between structured learning and guided, yet independent discovery. The sessions, resources and methods that are included reflect the belief that adults are capable of self-direction and creativity when encouraged to apply their knowledge and skills in ways that are relevant to their lives. It is the intent of the program to offer a framework to future Volunteers, so that they may apply what they have learned in training to their service in the Peace Corps.

# Program Components

Each of the technical and non-technical areas is related to and integrated with the other components of the program. This design highlights the connection and interdependence between technology and other aspects of development, and provides important parallels to community work. The training components are:

- \* Earthen Construction and Fuel-Saving Cookstoves
- \* Pedal/Treadle Power
- \* Solar Water Heaters
- \* Solar Agricultural Dryers
- \* Health and Nutrition
- \* The Role of the Volunteer in Development

# The Technical Areas: Cookstoves, Pedal/Treadle Power, Solar Applications

The program offers skills training in all stages of technological development: the design, construction, operation, maintenance, repair and evaluation of small-scale prototypes and devices. The designs are selected to be as consistent as possible with the realities of rural areas in most of the world, and are based on the following criteria:

- \* Affordable, and low in capital investment
- \* Simple and adaptable in both design and scale
- \* Easily understood by people with little or no formal education
- Responsive to local needs and abilities
- \* Able to be constructed, operated, maintained, repaired and managed by the users
- \* Based on the use of renewable sources of energy and local resources, both human and physical
- \* Characterized by the potential to contribute to local cooperation, self-reliance and good health

During the technical sessions, people are encouraged to modify, adjust or adapt the technologies to meet the requirements of Peace Corps assignments. Participants are urged to concentrate on the process of applying new information and skills in ways that extend beyond the specific designs or techniques used in the program.

### Health and Nutrition

This component includes a variety of topics that appear in specific health and nutrition sessions, as well as in each of the other program areas. The material covers:

\* Regional and global health issues

- \* Cross-cultural perspectives on health traditions and systems
- Personal health maintenance and first aid

\* Basic nutrition

\* Maternal and child health

\* The application of locally appropriate technologies to promote, maintain, restore and improve the health of the community.

### The Role of the Volunteer in Development

The sessions and activities in this component provide a framework and a context for the skills and knowledge gained in the other areas of the program. The materials have been designed to stimulate thought, and to guide people as they articulate their philosophy about appropriate community technology and the role they will take during Peace Corps service. Throughout the component, participants are asked to look at their own cultural perceptions, and clarify their values. They analyze the implications of technological change, and examine the importance of including, in the entire development process, all who will be affected by such change. It is in this component that people learn and begin to apply the principles and techniques of non-formal education and adult learning. Through discussion, reading, role-play and a variety of other activities, people are encouraged to develop and practice the skills that will enable them to be effective and sensitive community facilitators.

#### Program Themes

A number of related and fundamental themes appear throughout the program; these guide the development of the skills and qualities that will be necessary during Peace Corps service. The themes are introduced in the first week of training, and serve as a foundation upon which the rest of the program is built. Together, the themes illustrate the integrated nature of community work, as well as the parallels that are found in this training program.

In each area and phase of training, there is a focus on:

- Principles and techniques of non-formal education and adult learning
- \* Methods and approaches to solving problems
- \* Development issues
- \* Cross-cultural perspectives
- \* Health maintenance and promotion
- The process of assessment and evaluation

### Program Phases

The training program is divided into six structured blocks of time, termed "Phases." The first and last serve to introduce and conclude the program; each of the others is organized around a specific technical area, which is integrated with relevant information and activities from the other program components. Some sessions in each phase are designed to help people acquire, practice and apply technical and facilitation skills; others are included as core sessions, and complement the technical material with background information and added perspective. Within each phase, the sessions are presented in an order that helps people build upon previous knowledge, and apply what they have already learned about both technical and non-technical areas of community work. Following are descriptions of each phase.

### Phase I: Introduction to Training

The initial phase includes an overview of the content and themes that comprise the program. Here, the learning approach used in training is presented, and the principles of non-formal education are introduced. There is an emphasis on identifying the parallels that exist between training and future Volunteer service: Participants identify and examine the skills and qualities they will need in order to be sensitive and useful in community work, then begin to practice effective communication and facilitation skills.

### Phase II: Earthen Construction and Fuel-Saving Cookstoves

In this phase, there is a focus on both acquiring technical skills, and understanding the issues and considerations that influence the development of cookstove programs. The sessions in design, construction and application are integrated with related material in health, sanitation and the environment, communication skills, cross-cultural perspectives, and the effects of technological change on traditional societies.

### Phase III: Pedal/Treadle Power

The major technical themes are the design, construction, use and potential applications of devices that use the principles of power transfer. These include mobile and stationary dynapods and other human-powered machines. Related studies

include: maternal and child health, a view of community health and appropriate technologies, communication skills, and issues in international development. In addition, a mid-program evaluation takes place at the end of the phase.

### Phase IV: Solar Water Heaters

In conjunction with the design, construction and use of solar prototypes and devices, there is an emphasis on the importance of needs and resource assessment, and communication and facilitation skills. As part of the health component, first aid training is included in this phase.

# Phase V: Solar Agricultural Dryers

In both the technical and non-technical sessions, there is material included on food preservation and storage, issues of agriculture and land use, and possible methods of improving the health and nutrition status of a community through the use of locally appropriate technologies.

# Phase VI: Concluding the Program: The Energy Fair

As training draws to a close, the program themes are gathered and used as a basis for a final project. The participants plan and hold a community-wide energy fair to interest and educate people, and to demonstrate what has been learned during the program. In this phase, people have the opportunity to apply their facilitation and communication skills, and to use their talents and creativity to plan and carry out a major project. There is a focus on all aspects of project development and the evaluation process. In addition, the final phase serves as a transition to Peace Corps service, and to future work in appropriate community technology.

### Skills for Development Facilitators

As an outline and a summary of the knowledge, skills and qualities that are important for effective community work, the Skills for Development Facilitators have been compiled for use in this program (See Appendix A). The skills follow each stage and aspect of the facilitator's involvement, and include:

- \* Taking preparatory steps
- \* Establishing a dialogue
- \* Planning with the community
- \* Using the dialogue approach to carry out projects
- \* Evaluating the process

The Skills for Development Facilitators represent more than linear steps in the development of appropriate community technologies. They are part of a continuing process of building local self-reliance and capabilities. Each component of the program is designed so that all skill areas are emphasized throughout

the phases of training. There is a balance of skill areas included in each phase. These skills are indicated in both the phase calendars and the individual sessions. It is intended that the skills be developed and practiced during the entire program, so that by the end of training people have had the opportunity to move through each stage in the process of community involvement.

### NOTES TO THE TRAINING STAFF

This manual is intended as a resource to help plan, prepare for and conduct a program that is responsive to a variety of training situations. It is probable that you will use the manual in one of two ways: either in its entirety -- as developed, tested and evaluated, or in sections, when there is a need to focus on one or more of the technical components.

We encourage you to modify and adapt the materials to make them more useful. However, when making any changes, it is important to do so with care, in order to maintain the integrated nature of the program. It is essential to the effectiveness of training to provide a balance in the various skill areas, and to help people build upon and apply new knowledge in a way that is ordered and logical. Please read and follow the general guidelines that have been prepared to help you transform these training materials into a dynamic, appropriate tool for learning.

### Some First Steps: Planning and Preparation

There are many steps that occur before training actually begins: defining the program, locating a site, identifying participants and staff, gathering resources and materials, and performing a host of other logistical and preparatory tasks that sometimes appear endless, but that must be done before the program can happen. We include here some perspective to help you get started:

- \* What is the scope and content of your program?

  If it is an eight-week appropriate community technology training cycle, then it is probable that very little will change. However, if it is a shorter program, such as one that will be used for in-service training or other workshops, you may follow the calendars designed for that purpose (See Appendix B: Two-Week Workshops). Even if you will be using only one part of this manual, please read through all the quidelines, and note the design and format of the program.
- \* Where will training occur?
  It is best to choose a site that is conducive to experiential learning. It should include adequate room for people to build the technical devices, work in small groups, and if possible, be outdoors during much of the program. There should be a classroom or meeting facilities at the site, and a reference library where there is a quiet environment for reading and study. Although not essential, it is useful for training to be held in or near a community. Such proximity offers participants the opportunity to gain valuable field experience in assessing needs, working with people to solve problems, and practicing communication and facilitation skills. In addition, there are often many resources available in an established community: schools, libraries, health centers, as well as local organizations, businesses, cooperatives and small industries.

Who will participate? It is likely that the people who enter the program will represent a variety of backgrounds, abilities and outlooks. Use this diversity as a tool to promote learning among partici-

pants with sometimes very different levels of technical expertise, education and experience. It is a challenge that is worth the effort of all involved.

During this program, it is expected that a person who has basic practical skills and a desire to learn will have the opportunity to develop sufficient skills, knowledge and attitudes to serve as an effective and sensitive Peace Corps Volunteer. Before training begins, it is helpful to assess the participants' skill levels to get a sense of the experience and knowledge that each person brings to the program. It is also valuable to find out as much as possible about specific Peace Corps assignments, so that people can direct their education to meet future job requirements.

What are the staff considerations?

It is important that the entire training staff be familiar with the principles and techniques of non-formal education and adult learning, and that they be comfortable with the educational approach and style of the program. The staff should be flexible, and able to "let go" so that the participants are encouraged to take an active role in their education. When there is faith in the training group, they will respond with a high level of motivation, learning and responsibility. These benefits are well worth any "loss of control" involved.

Staff members should represent a balance of backgrounds and skills, and be able to complement one another's expertise. Each person should have practical skills in one area, an understanding of related issues, and a knowledge of the literature and resources in that field. It is helpful if the staff includes people who have lived and worked overseas, especially in the area of appropriate community technology. We suggest that the staff consist of at least one person in each of the following areas: the technologies (Fuel-Saving Cookstoves, Pedal/Treadle Power, Solar Water Heaters and Solar Agricultural Dryers); health and nutrition; development issues, including perspective on women's roles in the development process; and non-formal education and adult learning.

Although the number of staff will vary with individual programs, it is best if there is at least one staff member for each five participants. This ratio ensures individual attention in all aspects of the program, and helps dispel the "we/they" dichotomy that sometimes exists between staff and participants.

A staff training workshop should be scheduled before the program begins. This gives the staff an opportunity to build training skills, as well as to establish the cohesiveness necessary to function as a cooperative and effective team. The person who conducts staff training should be qualified and experienced in the educational approach used in the program, and have expertise in management training techniques. All staff members should participate in the workshop; it is crucial to the success of the program and should not be omitted.

If outside consultants are to be included in the program, consider and select them with care. It is important not to lose the focus of the program by including too many people who may not be familiar with the philosophy, methodology or details of training. However, we do recommend that local resource people be invited to participate in parts of the program, and that consultants be asked to lend perspective and provide additional information. Some suggested consultants include: community workers, appropriate technology practitioners, health and nutrition workers, artisans, farmers, and people who have lived and worked in other countries.

What resources and materials will be needed?
For the most part, these will be defined by what is available and appropriate for the training situation. Although very little is essential, we recommend that you follow the resources listed in each session. Use the bibliography as a guide. Each of the entries is coded as to its use and relative importance in the program. (See Appendix C.) Some of the texts are available from Peace Corps, and others must be purchased. Order books, films, slides and any other resource material with time to spare. As much as possible, anticipate training needs so that the materials will be available when they are needed.

Be certain that there are enough tools, supplies and other materials before the program begins. If the suggested items are not available, substitute with something comparable. Use your ingenuity, and you will find that the participants will follow your lead.

If there is not an established reference library at the training site, organize one based on the recommended readings in the bibliography. Include material about the countries in which the participants will serve, and add any other relevant resources. Try to keep the library current so that the resources meet the needs of the people who use them. The care and maintenance of the library may be a responsibility of the training participants once the program is underway.

Note that some of the recommended resources are protected by copyright, and that permission must be obtained before reproducing them for general use.

Remember that resources are usually helpful, but seldom essential. There is as much importance in finding a way to do without something that was considered absolutely necessary as there is in using it for its intended purpose.

# What kind of technical preparation is necessary?

In addition to gathering the tools and supplies, and locating adequate workspace, there is another preparation to be completed. The technical staff should think about the devices and materials to be used in the program, and determine if they are suitable for training purposes, as well as for incountry application. If the technical trainers have not already done so, they should build the prototypes and devices in order to gain added perspective on design considerations, construction techniques, time requirements, potential applications and possible problems. Such devices and prototypes may be used as demonstration models during the program.

### How will training be conducted?

The program may follow the manual design, so that all participants go through the phases at the same time. Although, if the group is larger than nine or ten people, another option may be pursued: that is, Phases II and III, IV and V may be scheduled concurrently. Half the participants learn the technical aspects of one phase, while half of them learn technical aspects of another. However, the core sessions in Health and Nutrition and the Role of the Volunteer in Development are presented to the entire group. For example, as Phase II and III are carried out, half the people concentrate on Fuel-Saving Cookstoves, and half on Pedal/Treadle Power. They are together for a number of core sessions, but during most the the technical sessions, they are involved in different areas. At the end of the phase, the groups switch, and the process is repeated using the core sessions from the other phase. Although the planning and logistics require additional thought and effort, this approach has been successful. It has reduced the need for additional staff, and has encouraged more participation, motivation and creativity as a result of smaller group size.

# The Next Steps: Conducting the Program

We include here some considerations that are important to remember as you carry out the program:

The experiential learning cycle is an essential part of training. Although it is not explicitly stated in each session, it is important that people have the opportunity to learn, examine, generalize about and apply new knowledge. Try to follow the experiential learning loop as often as possible, and encourage the participants to be aware of the process.

Small groups often make learning easier and more lasting. It is helpful to limit the size of groups to three, four or five people. Groups may be formed on the basis of regional or country assignments, skill levels, individual preference, or other criteria established by the staff and participants.

A variety of educational techniques is most effective. Experiment with role-plays, skits, panel discussions, brainstorming and other non-conventional ideas. Encourage people to use their creativity, and to examine which methods have the potential to be useful in community work. As you facilitate sessions, involve people and try to use techniques that others can learn. Remember that as you teach you will learn. Share your knowledge and motivate others to do the same.

Feedback is an important two-way process. At the beginning of sessions, especially the technical ones, allot some time for discussion of your previous session. Occasionally, use the last part of a session to discuss activities and the facilitation skills of the person or people involved. Make the effort to invite feedback, and to give and receive it with openness.

Sessions often require preparation. Be certain that you have read through a session, and that you completely understand it before the time comes to present it. Don't go into a session without preparing for it. Both you and the participants deserve the benefits of a session that has been well planned and conducted. Remember to outline the objectives and activities for people before the session begins, so that they will have an idea of what is expected of them and what they will be learning.

There are often several purposes to each session. For example, the activities may be designed to meet a technical objective, and at the same time provide people with an opportunity to practice facilitation skills and examine group interaction. Highlight the various levels whenever possible, and encourage people to notice them, as well.

As the program continues, participants become more responsible for the design and implementation of sessions. From the start, it is a good idea to include people as facilitators in selected activities and sessions. As the participants develop skills and self-confidence, they take an increased responsibility for their own education. By the last phase of training, they should be able to conduct nearly the entire program. Urge people to take an active role in facilitating, planning and evaluating a variety of learning experiences.

Assignments should be coordinated. Make sure that the training staff is aware of the work that has been assigned in each area, so that the participants are not overloaded with multiple assignments. It is also important that the participants understand what is expected of them, and that the purpose of each assignment is clear.

Scheduled breaks between sessions are essential. Although 10-15 minutes is suggested, more time may be needed, depending on the training circumstances.

- Unstructured time should be included in the program. People need time to think, read, mull over ideas, digest new information, and pursue independent study projects. It is easy to pack too much into an already crowded schedule, and it is not worth the scattered, tense situation that often results.
- Evaluation is a central part of the training program. Encourage people to develop and use criteria for evaluating themselves and the program during the sessions designed for that purpose. In addition, counterpart sessions have been scheduled throughout the program so that staff and participants have time to discuss and evaluate progress. Be certain that the entire evaluation process emphasizes improving skills, building upon strengths, and utilizing what has been learned during the training process.

### Using the Manual

One of the keys to the program's success is the appropriate use of the tools and techniques for carrying it out. We include here an explanation of the terminology and format of the manual to help you use it more effectively.

- Phase calendars indicate the schedule for each phase, as well as the skill areas that are emphasized in each session. Use the calendars as references for developing your own schedule, and post and review the schedule before the start of each phase. It is important that the participants have access to a current and revised schedule so that they can see the flow of sessions and understand the general design of the program.
- \* Sessions follow a general format. We include a sample on page 14 to illustrate the design and to explain the terminology used in all sessions.
- \* Attachments follow each session, and are usually intended for distribution to the participants. The attachments are coded as to phase and session. It is important to know when the attachments will be used, so that they can be copied and distributed when needed. If you wish, the attachments may be separated from the rest of the manual and kept in a binder for easy reference.
- Two-week workshop options appear in the form of 12-day calendars that include relevant core and technical sessions. These workshops are based on the program philosophy, and represent a way to provide comprehensive training when time considerations and other factors preclude a longer program.
- \* The bibliography (Appendix C) includes all the reference material, texts and suggested resources used in this program. Each component is included, and all entires are coded as to

subject matter and relative importance in the program. In addition to serving as a guide to establishing a reference library, the bibliography also may be distributed to the participants at the end of training, to be used as the basis for an expanding resource list.

# A final note:

Once training has ended, steps should be taken to bring closure to the program; paperwork must be completed and loose ends gathered. In addition, it is important to allow time for the staff to review what has occurred over the past weeks, to discuss ways of improving the program, and to make the transition from one training cycle to another. Such evaluations should be included in every program; they are worth the time and the effort of all involved.

# A SAMPLE SESSION TO ILLUSTRATE FORMAT AND EXPLAIN TERMINOLOGY

Indicates in which of the six program divisions the session belongs. Each session is numbered in sequence within the phase.

PHASE #: SESSION #

Tells which of the five major skill areas is emphasized in the session. (See Skills for Development Workers, Appendix A, for more information.)

SKILL AREA #

Refers to the numbering of pages in each session. If one phase/session is excerpted from the manual, the sessions will still be numbered so they can be kept in order.

PAGE #

SESSION TITLE:

Indicates the subject area being presented.

TOTAL TIME:

Gives the approximate time needed to carry out

the session.

OBJECTIVE(S):

Tells what is expected of the participants and what the session should accomplish. The objectives explain specifically what and why the participants should learn, understand or do. In addition, the objectives provide a way for staff and participants to evaluate the session and the amount of knowledge, skills or understanding that the participants have gained. At the beginning of the session, it is a good idea to review the objectives and have them visible.

RESOURCE(S):

Includes recommended and background readings, additional references for the trainer, attachments and, occasionally, films, slides or other educational materials. All resources are listed in the bibliography.

MATERIAL(S):

Refers to suggested supplies and tools needed for the session.

PROCEDURE(S):

Consists of steps to be followed in order to meet the objective(s). Each step is given an approximate time; however, these are guidelines and may change from program to program.

Trainer	No	te	S
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Appear throughout the session and serve to:

- Clarify and explain a procedure
- Provide background material and added perspective
- \* Suggest options

FRIDAY SATURDAY					PHASE III			
WEDNESDAY THURSDAY	PHASEI	(See Phase Calendar)		(See Phase Calendar)			(See Phase Calendar)	
DAY TUESDAY					PHASE I			
> A		EEK #J	M	NEEK #S	EK #3	a M E	MEEK #d	

